

NODE=M119

 **$D_2^*(2460)^0$**  $I(J^P) = \frac{1}{2}(2^+)$ 

$J^P = 2^+$  assignment strongly favored(ALBRECHT 89B, ALBRECHT 89H), natural parity confirmed by the helicity analysis(DEL-AMO-SANCHEZ 10P),

NODE=M119

 **$D_2^*(2460)0$  MASS**

The fit includes  $D^\pm, D^0, D_s^\pm, D^{*\pm}, D^{*0}, D_s^{*\pm}, D_1(2420)^0, D_2^*(2460)^0$ , and  $D_{s1}(2536)^\pm$  mass and mass difference measurements.

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>2462.6±0.6 OUR FIT</b>	Error includes scale factor of 1.2. FIT Scale factor = 1.3]		[2462.6 ± 0.7 MeV OUR 2012	NODE=M119M NEW
<b>2461.8±0.7 OUR AVERAGE</b>	Error includes scale factor of 1.1. 2012 AVERAGE Scale factor = 1.2]		[2461.8 ± 0.8 MeV OUR	NEW
2462.5±2.4 <sup>+1.3</sup> <sub>-1.1</sub>	2.3k	1 ABRAMOWICZ13 ZEUS	$e^\pm p \rightarrow D^{(*)} + \pi^- X$	
2462.2±0.1±0.8	243k	DEL-AMO-SA..10P BABR	$e^+ e^- \rightarrow D^+ \pi^- X$	
2460.4±1.2±2.2	3.4k	AUBERT 09AB BABR	$B^- \rightarrow D^+ \pi^- \pi^-$	
2461.6±2.1±3.3	2 ABE 04D BELL	$B^- \rightarrow D^+ \pi^- \pi^-$		
2464.5±1.1±1.9	5.8k	2 LINK 04A FOCS	$\gamma A$	
2465 ± 3 ± 3	486	AVERY 94C CLE2	$e^+ e^- \rightarrow D^+ \pi^- X$	
2453 ± 3 ± 2	128	FRABETTI 94B E687	$\gamma Be \rightarrow D^+ \pi^- X$	
2461 ± 3 ± 1	440	AVERY 90 CLEO	$e^+ e^- \rightarrow D^{*+} \pi^- X$	
2455 ± 3 ± 5	337	ALBRECHT 89B ARG	$e^+ e^- \rightarrow D^+ \pi^- X$	
2459 ± 3 ± 2	153	ANJOS 89C TPS	$\gamma N \rightarrow D^+ \pi^- X$	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2469.1±3.7 <sup>+1.2</sup> <sub>-1.3</sub>	1560±230	3 CHEKANOV 09 ZEUS	$e^\pm p \rightarrow D^{(*)} + \pi^- X$	
2463.3±0.6±0.8	20k	ABULENCIA 06A CDF	$1900 p\bar{p} \rightarrow D^+ \pi^- X$	
2461 ± 6	126	4 ABREU 98M DLPH	$e^+ e^-$	
2466 ± 7	1	ASRATYAN 95 BEBC	$53,40 \nu(\bar{\nu}) \rightarrow pX, dX$	

<sup>1</sup> From the combined fit of the  $M(D^+ \pi^-)$  and  $M(D^{*+} \pi^-)$  distributions. and  $A_{D_2}$  fixed to the theoretical prediction of -1.

<sup>2</sup> Fit includes the contribution from  $D_0^*(2400)^0$ .

<sup>3</sup> Calculated using the mass difference  $m(D_2^{*0}) - m(D^{*+})_{PDG}$  reported below and  $m(D^{*+})_{PDG} = 2010.27 \pm 0.17$  MeV. The 0.17 MeV uncertainty of the PDG mass value should be added to the experimental uncertainty of  $\pm 1.2$  MeV.

<sup>4</sup> No systematic error given.

NODE=M119M

NEW

NEW

NODE=M119M;LINKAGE=AR

NODE=M119M;LINKAGE=LI

NODE=M119M;LINKAGE=CH

NODE=M119M;LINKAGE=K

NODE=M119DM

NODE=M119DM

NODE=M119DM

NEW

NODE=M119DM2

NODE=M119DM2

NODE=M119DM2

NEW

The fit includes  $D^\pm, D^0, D_s^\pm, D^{*\pm}, D^{*0}, D_s^{*\pm}, D_1(2420)^0, D_2^*(2460)^0$ , and  $D_{s1}(2536)^\pm$  mass and mass difference measurements.

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>593.0±0.6 OUR FIT</b>	Error includes scale factor of 1.3. FIT Scale factor = 1.3]		[593.0 ± 0.7 MeV OUR 2012	NODE=M119DM
<b>593.9±0.6±0.5</b>	20k	ABULENCIA 06A CDF	$1900 p\bar{p} \rightarrow D^+ \pi^- X$	NEW

 **$m_{D_2^{*0}} - m_{D^{*+}}$** 

The fit includes  $D^\pm, D^0, D_s^\pm, D^{*\pm}, D^{*0}, D_s^{*\pm}, D_1(2420)^0, D_2^*(2460)^0$ , and  $D_{s1}(2536)^\pm$  mass and mass difference measurements.

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>452.3±0.6 OUR FIT</b>	Error includes scale factor of 1.3. FIT Scale factor = 1.3]		[452.3 ± 0.7 MeV OUR 2012	NODE=M119DM2
<b>458.8±3.7<sup>+1.2</sup><sub>-1.3</sub></b>	1560±230	CHEKANOV 09 ZEUS	$e^\pm p \rightarrow D^{(*)} + \pi^- X$	NEW

**$D_2^*(2460)^0$  WIDTH**

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>49.0 ± 1.3 OUR AVERAGE</b>				Error includes scale factor of 1.5. See the ideogram below.
[49.0 ± 1.4 MeV OUR 2012 AVERAGE Scale factor = 1.7]				
46.6 ± 8.1 ± 5.9	2.3k	5 ABRAMOWICZ13	ZEUS	$e^\pm p \rightarrow D(\ast) + \pi^- X$
50.5 ± 0.6 ± 0.7	243k	DEL-AMO-SA...10P	BABR	$e^+ e^- \rightarrow D^+ \pi^- X$
41.8 ± 2.5 ± 2.9	3.4k	AUBERT	09AB BABR	$B^- \rightarrow D^+ \pi^- \pi^-$
49.2 ± 2.3 ± 1.3	20k	ABULENCIA	06A CDF	$1900 p\bar{p} \rightarrow D^+ \pi^- X$
45.6 ± 4.4 ± 6.7	6 ABE		04D BELL	$B^- \rightarrow D^+ \pi^- \pi^-$
38.7 ± 5.3 ± 2.9	5.8k	LINK	04A FOCS	$\gamma A$
28 ± 8 ± 6	486	AVERY	94C CLE2	$e^+ e^- \rightarrow D^+ \pi^- X$
25 ± 10 ± 5	128	FRABETTI	94B E687	$\gamma Be \rightarrow D^+ \pi^- X$
20 ± 9 ± 9	440	AVERY	90 CLEO	$e^+ e^- \rightarrow D^{*\ast} + \pi^- X$
15 ± 13 ± 5	337	ALBRECHT	89B ARG	$e^+ e^- \rightarrow D^+ \pi^- X$
20 ± 10 ± 5	153	ANJOS	89C TPS	$\gamma N \rightarrow D^+ \pi^- X$

5 From the combined fit of the  $M(D^+ \pi^-)$  and  $M(D^{*\ast} + \pi^-)$  distributions. and  $A_{D_2}$  fixed to the theoretical prediction of -1.

6 Fit includes the contribution from  $D_0^*(2400)^0$ .

NODE=M119W

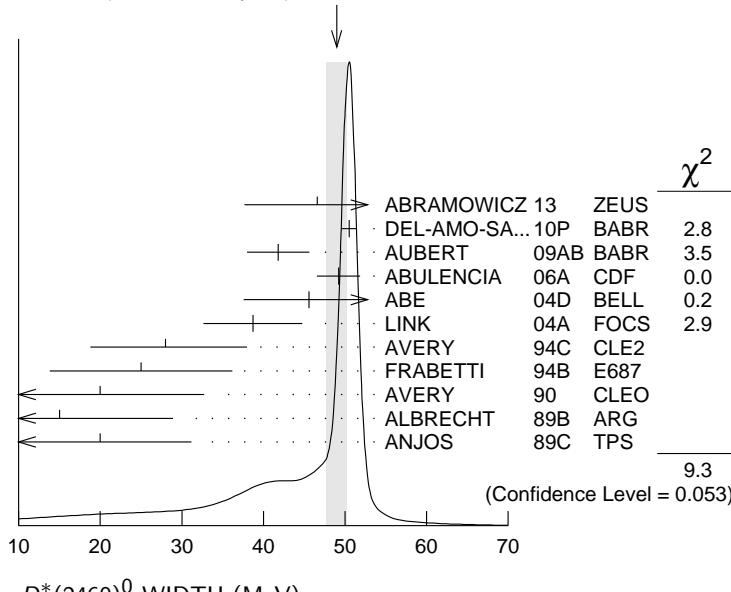
NODE=M119W

NEW

NODE=M119W;LINKAGE=AR

NODE=M119W;LINKAGE=LI

WEIGHTED AVERAGE  
49.0±1.3 (Error scaled by 1.5)

 **$D_2^*(2460)^0$  DECAY MODES**

$\overline{D}_2^*(2460)^0$  modes are charge conjugates of modes below.

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1 D^+ \pi^-$	seen
$\Gamma_2 D^*(2010)^+ \pi^-$	seen
$\Gamma_3 D^0 \pi^+ \pi^-$	not seen
$\Gamma_4 D^{*0} \pi^+ \pi^-$	not seen

NODE=M119215;NODE=M119

NODE=M119

CLUMP=A;DESIG=1

DESIG=2

DESIG=3;OUR EST;→ UNCHECKED ←  
DESIG=4;OUR EST;→ UNCHECKED ← **$D_2^*(2460)^0$  BRANCHING RATIOS**

Γ( $D^+ \pi^-$ )/Γ <sub>total</sub>	EVTS	DOCUMENT ID	TECN	COMMENT	Γ <sub>1</sub> /Γ
seen	3.4k	AUBERT	09AB BABR	$B^- \rightarrow D^+ \pi^- \pi^-$	
seen	337	ALBRECHT	89B ARG	$e^+ e^- \rightarrow D^+ \pi^- X$	
seen		ANJOS	89C TPS	$\gamma N \rightarrow D^+ \pi^- X$	

NODE=M119220

NODE=M119R1

NODE=M119R1

$\Gamma(D^*(2010)^+\pi^-)/\Gamma_{\text{total}}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
seen	ACKERSTAFF 97W	OPAL	$e^+ e^- \rightarrow D^*+\pi^- X$
seen	AVERY 90	CLEO	$e^+ e^- \rightarrow D^*+\pi^- X$
seen	ALBRECHT 89H	ARG	$e^+ e^- \rightarrow D^*\pi^- X$

 $\Gamma_2/\Gamma$ NODE=M119R2  
NODE=M119R2 $\Gamma(D^+\pi^-)/\Gamma(D^*(2010)^+\pi^-)$ 

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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**1.54±0.15 OUR AVERAGE**[ $1.56 \pm 0.16$  OUR 2012 AVERAGE]

$1.4 \pm 0.3 \pm 0.3$	2.3k	<sup>7</sup> ABRAMOWICZ13	ZEUS	$e^\pm p \rightarrow D^{(*)}+\pi^- X$
$1.47 \pm 0.03 \pm 0.16$	379k	DEL-AMO-SA..10P	BABR	$e^+ e^- \rightarrow D^{(*)}+\pi^- X$
$2.8 \pm 0.8 \begin{matrix} +0.5 \\ -0.6 \end{matrix}$	$1560 \pm 230$	CHEKANOV 09	ZEUS	$e^\pm p \rightarrow D^{(*)}+\pi^- X$
$2.2 \pm 0.7 \pm 0.6$		AVERY 94C	CLE2	$e^+ e^- \rightarrow D^*+\pi^- X$
$2.3 \pm 0.8$		AVERY 90	CLEO	$e^+ e^-$
$3.0 \pm 1.1 \pm 1.5$		ALBRECHT 89H	ARG	$e^+ e^- \rightarrow D^*\pi^- X$

• • • We do not use the following data for averages, fits, limits, etc. • • •

1.9 $\pm 0.5$	ABE 04D	BELL	$B^- \rightarrow D^{(*)}+\pi^- \pi^-$
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<sup>7</sup> From the combined fit of the  $M(D^+\pi^-)$  and  $M(D^{*+}\pi^-)$  distributions. and  $A_{D_2}$  fixed to the theoretical prediction of  $-1$ .

NODE=M119R3  
NODE=M119R3  
NEW $\Gamma(D^+\pi^-)/[\Gamma(D^+\pi^-) + \Gamma(D^*(2010)^+\pi^-)]$ 

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.62 $\pm 0.03 \pm 0.02$	8414	<sup>8</sup> AUBERT	09Y BABR	$B^+ \rightarrow D_2^{*0} \ell^+ \nu_\ell$
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<sup>8</sup> Assuming  $\Gamma(\gamma(4S) \rightarrow B^+ B^-) / \Gamma(\gamma(4S) \rightarrow B^0 \bar{B}^0) = 1.065 \pm 0.026$  and equal partial widths for charged and neutral  $D_2^*$  mesons.

 $\Gamma_1/(\Gamma_1+\Gamma_2)$ NODE=M119R01  
NODE=M119R01 **$D_2^*(2460)^0$  POLARIZATION AMPLITUDE  $A_{D_2}$** 

A polarization amplitude  $A_{D_2}$  is a parameter that depends on the initial polarization of the  $D_2$ . For  $D_2$  decays the helicity angle,  $\theta_H$ , distribution varies like  $1 + A_{D_2} \cos^2(\theta_H)$ , where  $\theta_H$  is the angle in the  $D^*$  rest frame between the two pions emitted by the  $D_2 \rightarrow D^* \pi$  and  $D^* \rightarrow D \pi$ .

NODE=M119PAM

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-1.16 \pm 0.35$	2.3k	<sup>9</sup> ABRAMOWICZ13	ZEUS	$e^\pm p \rightarrow D^{(*)}+\pi^- X$
consistent with $-1$	243k	DEL-AMO-SA..10P	BABR	$e^+ e^- \rightarrow D^+\pi^- X$

NODE=M119PAM

<sup>9</sup> From the combined fit of the  $M(D^+\pi^-)$  and  $M(D^{*+}\pi^-)$  distributions.

10 Systematic uncertainties not estimated.

NODE=M119PAM;LINKAGE=AB  
NODE=M119PAM;LINKAGE=AV **$D_2^*(2460)^0$  REFERENCES**

ABRAMOWICZ 13	NP B866 229	H. Abramowicz <i>et al.</i>	(ZEUS Collab.)
DEL-AMO-SA... 10P	PR D82 111101	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
AUBERT 09AB	PR D79 112004	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT 09Y	PRL 103 051803	B. Aubert <i>et al.</i>	(BABAR Collab.)
CHEKANOV 09	EPJ C60 25	S. Chekanov <i>et al.</i>	(ZEUS Collab.)
ABULENCIA 06A	PR D73 051104	A. Abulencia <i>et al.</i>	(CDF Collab.)
ABE 04D	PR D69 112002	K. Abe <i>et al.</i>	(BELLE Collab.)
LINK 04A	PL B586 11	J.M. Link <i>et al.</i>	(FOCUS Collab.)
ABREU 98M	PL B426 231	P. Abreu <i>et al.</i>	(DELPHI Collab.)
ACKERSTAFF 97W	ZPHY C76 425	K. Ackerstaff <i>et al.</i>	(OPAL Collab.)
ASRATYAN 95	ZPHY C68 43	A.E. Asratyan <i>et al.</i>	(BIRM, BELG, CERN+) (BIRM, BELG, CERN+)
AVERY 94C	PL B331 236	P. Avery <i>et al.</i>	(CLEO Collab.)
FRABETTI 94B	PRL 72 324	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
AVERY 90	PR D41 774	P. Avery, D. Besson	(CLEO Collab.)
ALBRECHT 89B	PL B221 422	H. Albrecht <i>et al.</i>	(ARGUS Collab.) JP
ALBRECHT 89H	PL B232 398	H. Albrecht <i>et al.</i>	(ARGUS Collab.) JP
ANJOS 89C	PRL 62 1717	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)

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